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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KUMAR, PANKAJ	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 12/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/921,757	TAUNTON, MARK	
	Examiner	Art Unit	
	Pankaj Kumar	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/6/2001, 1/6/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. DETAILED ACTION

2. Information Disclosure Statement

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

4. Specification

5. The disclosure is objected to because of the following informalities:

   a. "signalling" should be spelled as signaling

   b. "modelling" should be spelled as modeling

   c. "modelled" should be spelled as modeled

   d. "generalised" should be spelled as generalized

6. Appropriate correction is required.

7. Claim Objections

8. Claims 1-14 are objected to because of the following informalities:

   e. "signalling" should be spelled as signaling;

   f. "modelling" should be spelled as modeling;

   g. "modelled" should be spelled as modeled

9. Appropriate correction is required.

10. Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

12. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 1-5, 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moss EP1104140A2. Here is how the reference teaches the claims:

14. As per claim 1: A modulation method for multiple-tone signalling using a system with an analogue front end, comprising the steps of: feeding a symbol data stream of multiple tone symbols (Moss fig. 3: Splitter; paragraph 21: splitter separates inputs into different sub-bands) to a model (Moss fig. 3: 54, 56. 64) and to a buffer (Moss fig. 3: 24) for onward transmission to the analogue front end (Moss fig. 3: 16; fig. 7: output of the transmitter changes non-discretely based on the input), in the model (Moss fig. 3: 54, 56, 64), modelling the peak amplitude that will be present in the symbol data stream after subsequent processing by the analogue front end (Moss fig. 3: 58; paragraph 18: model processes signal in the same way as it would be processed in the amplifier); feeding forward a control signal based on the modelled peak amplitude from the model to the analogue front end (Moss fig. 3: signalling); and outputting the symbol data stream from the buffer through the analogue front end under the control of the control signal (Moss fig. 3: outputting through 16 via 22).

15. What Moss does not teach is that the control signal is based on the modeled amplitude peaks; however, it would have been obvious, to one of ordinary skill in the art, at time the

invention was made, to modify the prior art teaching of Moss with the control signal being based on the modeled amplitude peaks as recited by the instant claims, because Moss suggests that a control signal is based on a combination of the low level estimator 60 and clip or peak estimator 56 in the analogous art of feed forward transmission. Since Moss teaches that the signaling is due to 56 and 60, this also means it is due to 56.

16. As per claim 2: A method according to claim 1 wherein the analogue front end includes an amplifier (Moss fig. 3: amplifier 16 via 22) operable from a plurality of different voltage levels (Moss fig. 3: +/- in 22), and wherein the control signal selects one of the plurality of different voltage levels in the amplifier (Moss fig. 3: signaling to the amp 16 is meant to inform the receiver about the position of the + or – in 22; hence signaling selects amps message to the receiver about the position of + or – in 22).

17. As per claim 3: A method according to claim 1 including preprocessing the symbol data stream in the analogue front end (Moss fig. 3: 16 preprocessing before transmission), and modelling the preprocessing in the model (Moss fig. 54, 56, 64; paragraph 18: model processes signal in the same way as it would be processed in the amplifier).

18. As per claim 4: A method according to claim 3 wherein the modelling is carried out separately on each symbol (Moss fig. 3: individual data is going through various elements such as 58, sequentially and thus modeling is carried out separately for each symbol).

19. As per claim 5: A method according to claim 4 further comprising processing an input data stream through a plurality of intermediate processing stages and corresponding stages of intermediate data to generate the symbol data stream (Moss fig. 3: processing data through the various elements of fig. 3), and if the modelled peak amplitude in a particular symbol in the

symbol data stream exceeds a predetermined threshold, amending predetermined intermediate data such that the input data is still represented by the intermediate data (Moss fig. 3: if threshold is exceeded in 56, data is amended by being clipped which still represents high data), carrying out the subsequent intermediate processing stages on the intermediate data to regenerate the particular symbol in the symbol data stream (Moss fig. 3: elements past clipper 58), and replacing the particular symbol with the regenerated symbol (Moss paragraph 26: "The limiter 80 clips the signal in the same way as it is clipped when transmitted through the transmitter amplifier 16").

20. As per claim 12: A computer program product for controlling a modulator connected to an analogue front end, the computer program product adapted to cause the modulator to carry out the steps of: processing a symbol data stream of multiple tone symbols, modelling the amplitude peaks that will be present in the symbol data stream after subsequent processing by the analogue front end, and generating a control signal based on the modelled amplitude peaks from the model for controlling the analogue front end (discussed above with respect to other claims and paragraph 16 discusses figure 6 with computer simulation).

21. What Moss does not teach is that the control signal is based on the modeled amplitude peaks; however, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to modify the prior art teaching of Moss with the control signal being based on the modeled amplitude peaks as recited by the instant claims, because Moss suggests that a control signal is based on a combination of the low level estimator 60 and clip or peak estimator 56 in the analogous art of feed forward transmission. Since Moss teaches that the signaling is due to 56 and 60, this also means it is due to 56.

22. As per claim 13: A computer program product according to claim 12 adapted to cause the modulator to carry out the further steps of: processing an input data stream through a plurality of intermediate processing stages and corresponding stages of intermediate data to generate the symbol data stream (Moss fig. 3: processing data through the various elements of fig. 3), and if the modelled peak amplitude in a particular symbol in the symbol data stream exceeds a predetermined threshold, amending predetermined intermediate data such that the input data is still represented by the intermediate data (Moss fig. 3: if threshold is exceeded in 56, data is amended by being clipped which still represents high data), carrying out the subsequent intermediate processing stages on the intermediate data to regenerate a symbol in the symbol data stream (Moss fig. 3: elements past clipper 58), and replacing the particular symbol with the regenerated symbol (Moss paragraph 26: "The limiter 80 clips the signal in the same way as it is clipped when transmitted through the transmitter amplifier 16").

23. As per claim 14: A multiple tone transmission system comprising: a transmitter including a modulator for generating a symbol data stream of multiple tone symbols, an analogue front analogue front end for driving a line; and a model for processing the symbol data stream to predict the amplitude peaks present in the symbol data stream after subsequent processing by the analogue front end and for feeding forward a control signal based on the modelled amplitude peaks to the analogue front end; and wherein the analogue front end includes a control input for accepting the control signal and the analogue front end processes the symbol data stream under the control of the control signal; end for processing the symbol data stream, the including a digital to analogue converter and a line driver further comprising a transmission line (up to here discussed above with respect to other claims); and a receiver connected to the transmission line

to decode the transmitted data stream (Moss paragraph 10: "... it is necessary to include, in the transmitted signal, signalling data which tells the receiver ..."; paragraph 11; fig. 2).

24. What Moss does not teach is that the control signal is based on the modeled amplitude peaks; however, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to modify the prior art teaching of Moss with the control signal being based on the modeled amplitude peaks as recited by the instant claims, because Moss suggests that a control signal is based on a combination of the low level estimator 60 and clip or peak estimator 56 in the analogous art of feed forward transmission. Since Moss teaches that the signaling is due to 56 and 60, this also means it is due to 56.

25. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moss EP1104140A2 in view of Kaneko 6009073. Here is how the reference teaches the claims:

26. As per claim 6: A multiple tone modem comprising: a modulator (Moss fig. 3: mapper; paragraph 7: mapper provides QAM signal to IFFT) for generating a symbol data stream of multiple tone symbols (Moss fig. 3: Splitter; paragraph 21: splitter separates inputs into different sub-bands); an analogue front end for processing the symbol data stream, the analogue front end including a digital to analogue converter (not in Moss but would be obvious as explained below) and a line driver for driving a line (Moss fig. 3: 16 is driving by amplifying the line); and a model (Moss fig. 3: 54, 56, 64) for processing the symbol data stream to predict the amplitude peaks present in the symbol data stream after subsequent processing by the analogue front end (Moss fig. 3: 58; paragraph 18: model processes signal in the same way as it would be processed in the amplifier hence, modeling predicts the amplitude peaks of what would exist in the

amplifier 16) and for feeding forward a control signal based on the modelled amplitude peaks to the analogue front end (Moss fig. 3: signalling); wherein the analogue front end includes a control input for accepting the control signal and the analogue front end processes the symbol data stream under the control of the control signal (Moss fig. 3: outputting through 16 via 22 and 16 receives the signalling signal).

27. Moss does not teach a digital to analogue converter. What Kaneko 6009073 teaches is a digital to analogue converter (Kaneko fig. 1: 17). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the digital to analogue converter as recited by the instant claims, because the combined teaching of Moss with Kaneko suggest digital to analogue with feedforward transmission of symbols as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Moss with Kaneko because Moss suggests transmission of symbols (something broad) in general and Kaneko suggests the beneficial use of digital to analogue conversion in the analogous art of feedforward transmission of symbols.

28. Moss does not teach that the control signal is based on the modeled amplitude peaks; however, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to modify the prior art teaching of Moss with the control signal being based on the modeled amplitude peaks as recited by the instant claims, because Moss suggests that a control signal is based on a combination of the low level estimator 60 and clip or peak estimator 56 in the analogous art of feed forward transmission. Since Moss teaches that the signaling is due to 56 and 60, this also means it is due to 56.

29. As per claim 7: A multiple tone modem according to claim 6 wherein the analogue front end includes a line driver (Moss fig. 3: 16 is driving by amplifying the line) connected to a plurality of different power supply voltage levels (Moss fig. 3: +/- in 22) and the control signal selects one of the power supply voltage levels based on the amplitude peaks in the symbol data stream (Moss fig. 3: signaling to the amp 16 is meant to inform the receiver about the position of the + or – in 22; hence signaling selects amps message to the receiver about the position of + or – in 22).

30. As per claim 8: A multiple tone modem according to claim 6 further comprising a data buffer (Moss fig. 3: 24) between the modulator (Moss fig. 3: mapper; paragraph 7: mapper provides QAM signal to IFFT) and the analogue front end (Moss fig. 3: 16).

31. As per claim 9: A multiple tone modem according to claim 6 wherein the analogue front end further comprises a preprocessing module for preprocessing the symbol data stream (Moss fig. 3: 16 preprocessing before transmission), and wherein the model models the preprocessing (Moss fig. 54, 56, 64; paragraph 18: model processes signal in the same way as it would be processed in the amplifier).

32. As per claim 10: A multiple tone modem according to claim 8 wherein the model models the peak amplitude separately for each symbol in the symbol data stream (Moss fig. 3: individual data is going through various elements such as 58, sequentially and thus modeling of the peak amplitude is carried out separately for each symbol).

33. As per claim 11: A multiple tone modem according to claim 10 wherein: the modulator includes a plurality of intermediate processing stages for processing an input data stream through a plurality of stages of intermediate data and generating the symbol data stream (Moss fig. 3:

processing data through the various elements of fig. 3), and the modulator further comprises a regeneration control system actuated if the modelled peak amplitude in a symbol exceeds a predetermined threshold to amend predetermined intermediate data such that the input data is still represented by the intermediate data (Moss fig. 3: if threshold is exceeded in 56, data is amended by being clipped which still represents high data), and to carry out the subsequent intermediate processing stages on the amended intermediate data to regenerate a replacement symbol (Moss fig. 3: elements past clipper 58; paragraph 26: "The limiter 80 clips the signal in the same way as it is clipped when transmitted through the transmitter amplifier 16").

34. Conclusion

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pankaj Kumar whose telephone number is (571) 272-3011. The examiner can normally be reached on Mon, Tues, Thurs and Fri after 8AM to after 6:30PM.

36. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

37. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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